Estimating the impact of hypothetical portfolio reductions on production of major discoveries funded by the National Institute of Allergy and Infectious Diseases

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INTRODUCTION

NIH's annual budget continues to be a topic of concern for stakeholders. Of particular concern is the impact that a reduced or continuing flat budget might have on research outcomes. One approach for estimating the potential impact of reduced funding is to use scenario analysis to determine what might have happened were successful grant applications not funded. To conduct this counterfactual analysis, the National Institute of Allergy and Infectious Diseases (NIAID) assessed the relationship between the scores of peer-reviewed, funded R01 applications (FY 2004- FY2008) and discoveries identified as significant by NIAID senior staff. Two sets of analyses were conducted: 1) An initial exploratory analysis to characterize the discoveries, 2) A comparison of characteristics of R01s associated with discoveries with R01s not associated.

1. EXPLORATORY ANALYSIS

Materials and Methods

- NIAD identified 138 discoveries (or "advances") published in literature between 2005 and 2009 and provided this list to Science and Technology Policy Institute (STPI)
- Complex script written to scan attributes of each discovery for grant numbers, query them in QVR, and populate a database
- QVR pulled a total of 10,323 awards of all types (ex. 1, 2, 5, etc.)
- Variables downloaded from QVR include:
  - Priority scores and percentiles (if available)
  - Award amount and year
  - Study section
  - Full grant number
  - Institution and institution state
  - Principal investigator (PI) name

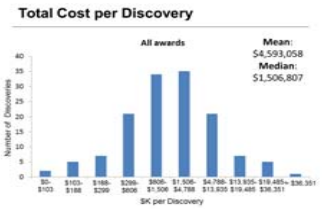
Exclusions

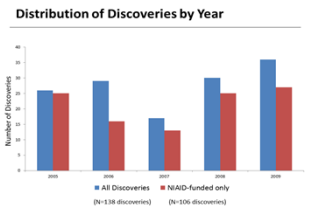
- Only the most recent Type 1 or 2 was retained
- R37 (i.e. MERIT) and R56 (i.e. High Priority, Short-term Project) awards were excluded, but the associated R01s were kept
- Contracts and intramural awards were excluded from the analysis

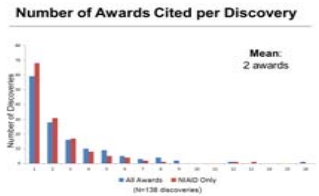
Summary

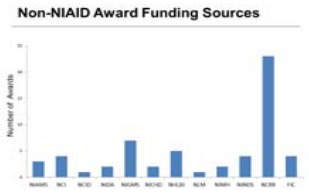
- 138 unique discoveries were associated with 305 unique awards (247 of which were NIAID)
- 77% of the discoveries were funded exclusively by NIAID
- The median cost per discovery was about $1.5 million, and the discoveries, on average, reported contributions from two NIAID awards

Results









2. COUNTERFACTUAL ANALYSIS

Materials and Methods

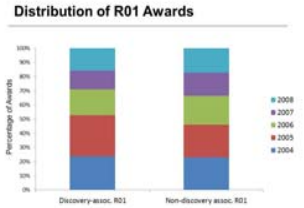
- Only R01s examined due to:
  - Highest percentage of awards funding NIAID discoveries
  - Primary funding mechanism for basic and applied research
  - Percentile and payline data easily accessible
- Appropriations data for each FY (2004-2008)
  - Amount appropriated to NIAID (NIAID Factbook)
  - Amount allocated to extramural awards (NIAID Factbook)
  - Amount allocated to R01s (by type) (NIH RePORTER)
- Number of awards and applications reviewed (NIH RePORTER)
- All Type 1 and Type 2 R01s extracted from QVR for FY 2004-2008
- R01s removed from analysis
  - Those not associated with selected discoveries
  - Those with scores missing or above the payline for a given FY
- Analysis restricted to the 40 discoveries associated with at least one R01
  - 10 discoveries excluded because percentile information for the R01s was missing (N=4) or was above the payline (N=6) for the FY of funding
- 38 R01s considered for the analysis
- Amount of appropriated funds allowed to vary, but several factors within each FY held constant including:
  - Percentage of allocated funds dedicated to extramural awards
  - Percentage of extramural funds dedicated to Type 1 and Type 2 R01s
  - Cost per R01
  - Cost per R01 estimated by the budget office (based on previous years) is equal to the actual cost per R01 reported for that FY

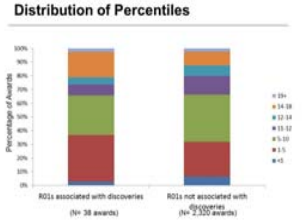
Awards Above the Payline

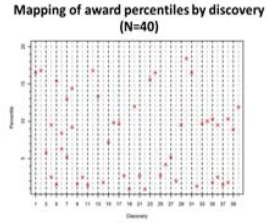
- Whether select pay or other awards outside of the payline would have been lost is uncertain
- Assumed that these awards would not be affected and therefore excluded from analysis
- Ancillary analysis conducted to determine whether discoveries had higher percentages of awards outside of payline

	Below Payline	Above Payline	Total
Non-Discovery	85.5	14.5	100
	2,320	394	2,714
Discovery	86.4	13.6	100
	38	6	44

Results

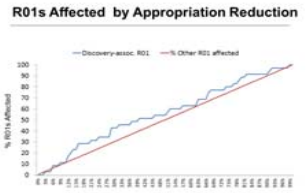






Procedure for Counterfactual

1. For each FY, calculate the reduction in extramural allocations, total funding for Type 1 and Type 2 R01s as a function for each percent reduction in overall appropriations
2. Calculate the number of awards lost by holding the cost per R01 constant
3. Order all R01s by percentile (high to low) and eliminate awards according to the number of awards lost at each percent reduction in overall appropriations



CONCLUSIONS

- Results from the descriptive analysis demonstrate the complexities of how discoveries are generated and reinforce the challenges of attributing significant discoveries to a single award
- Even small reductions in the budget could result in the loss of discoveries
- Applications having percentiles above the payline, yet were funded, were no less likely to yield a discovery than those within a payline

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